IS 10236-15 (1986): Procedure for basic climatic and durability test for optical instruments, Part 15: Drop test [PGD 22: Educational Instruments and Equipment]

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Indian Standard

PROCEDURE FOR BASIC CLIMATIC AND DURABILITY TESTS FOR OPTICAL INSTRUMENTS

PART 15 DROP TEST

UDC 681·7 : 620·165·72

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PROCEDURE FOR BASIC CLIMATIC AND DURABILITY TESTS FOR OPTICAL INSTRUMENTS

PART 15 DROP TEST

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PROCEDURE FOR BASIC CLIMATIC AND DURABILITY TESTS FOR OPTICAL INSTRUMENTS

PART 15 DROP TEST

0. FOREWORD

0.1 This Indian Standard (Part 15) was adopted by the Indian Standards Institution on 7 August 1986, after the draft finalized by the Optical and Mathematical Instruments Sectional Committee had been approved by the Mechanical Engineering Division Council.

0.2 Fast development in the field of instruments had brought a significant change in their basic content and design. It has been felt over the years that IS : 2352-1963* does not cater for the present day needs of the instruments and is also not in line with the recent trends in climatic and environmental testing procedures to be adopted for imporving their quality and reliability. It has, therefore, become necessary to have uniform and more rational testing procedures as far as possible. This series of standards on climatic and durability test (IS : 10236) has been prepared with this objective.

0.2.1 It is proposed to withdraw the existing Indian Standard (IS : 2352-1963*) as soon as the tests mentioned therein are covered in the new series (IS : 10236).

1. SCOPE

1.1 This standard (Part 15) covers the procedure for conducting drop test.

2. TERMINOLOGY

2.1 For the purpose of this standard the definitions given in IS : 10236 (Part 1)† shall apply.

*Procedure for basic climatic and durability tests for optical instruments.

†Procedure for basic climatic and durability tests for optical instruments: Part 1 General (*under preparation*).

3. OBJECT

3.1 To determine the suitability of optical instruments for applications where they are likely to be dropped or otherwise roughly handled such as during use and transportation.

4. INITIAL MEASUREMENTS

4.1 The instrument shall be visually examined, and optically, electrically and mechanically checked as required by the relevant instrument specification.

5. TEST EQUIPMENT

5.1 Equipment 1

5.1.1 A drop test bed as described in **5.1.2** to **5.1.4** shall be used for conducting the test.

5.1.2 The drop test bed shall consist of approximately 150 mm thick good river sand covered with one layer of canvas.

5.1.3 The surface dimensions of the bed shall be larger than the largest surface of the specimen under test. A suitable enclosure with felt lining or any other suitable arrangement may be provided around the sand bed to avoid damage on account of instrument accidently falling on the hard surface.

5.1.4 The method of releasing the specimen shall be such as to allow free fall from the desired height, with a minimum of disturbance in its position at the moment of release.

5.2 Equipment 2

5.2.1 A drop test platform as described in **5.2.2** to **5.2.4** shall be used for conducting the test.

5.2.2 The drop test platform shall consist of a steel plate not less than 6 mm thick which has been wet floated on and bolted down to a fully set concrete block of at least 50 cm thickness.

5.2.3 The surface dimensions of the steel plate shall be larger than the largest surface of the specimen under test.

5.2.4 The method of releasing the specimen shall be such as to allow free fall from the desired height, with a minimum of disturbance in its position at the moment of release.

6. TEST SEVERITIES

6.1 The severity indicated by height of fall shall be as specified in the relevant instrument specification. The value may be selected from those given in **6.2** and **6.3** on the basis of test equipment used.

6.2 Equipment 1

A_1 — Height of fall = 150 cm
B_1 — Height of fall = 120 cm
C_1 — Height of fall = 90 cm
D_1 — Height of fall = 60 cm
E_1 — Height of fall = 30 cm
} With or without case as specified

6.3 Equipment 2

A_2 — Height of fall = 10·0 cm
B_2 — Height of fall = 5·0 cm
C_2 — Height of fall = 2·5 cm
} Instrument not in its case

A_3 — Height of fall = 100 cm
B_3 — Height of fall = 50 cm
C_3 — Height of fall = 25 cm
} Instrument in its case

7. TEST PROCEDURE

7.1 The instrument shall be subjected to this test in unpacked condition or in its case. This shall be specified in the relevant instrument specification.

7.2 The instrument with or without case, shall be allowed to fall freely on the test bed/platform from the desired height as required by the severities given in **6.**

7.3 The height of drop shall be measured from that point of specimen nearest to the surface of the test bed or platform when suspended/held prior to dropping.

7.4 The instrument in its case shall be dropped once on each face. Where instrument not in its case is to be tested it shall be dropped once in each of the six directions of the three mutually perpendicular axes convenient for the instrument which shall be specified in the relevant instrument specification.

NOTE — Any change regarding 'height of fall' altitude and number of drops shall be specified in the relevant instrument specification.

8. FINAL MEASUREMENTS

8.1 The instrument shall be visually examined for any signs of mechanical damage or looseness of parts. Its performance shall also be checked in accordance with the relevant instrument specification. In case of sealed instruments they shall also be checked for leaks.

9. DETAILS TO BE GIVEN IN RELEVANT INSTRUMENT SPECIFICATION

9.1 The relevant instrument specification shall state the following for carrying out this test:

a) Initial observations/measurements;
b) Equipment used for the test;
c) Test severity;
d) Testing with or without case;
e) Attitude and number of drops in each attitude;
f) Any change in test conditions, if required;
g) Final observations/measurements; and
h) Any deviation from the normal procedure.